MYCOTAXON

ISSN (print) 0093-4666 (online) 2154-8889 Mycotaxon, Ltd. ©2019

April–June 2019—Volume 134, pp. 359–367

https://doi.org/10.5248/134.359

Pseudocercospora meliosmicola sp. nov. and three new *Pseudocercospora* records from China

Qian Zhao[1], Bao-Ju Li[1], Yan-Xia Shi[1],
Xue-Wen Xie[1], A-Li Chai[1], Ying-Lan Guo[2]*

[1]*Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing 100081, P.R. China.*

[2] *Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, P.R. China*

* Correspondence to: *guoyl@im.ac.cn*

Abstract—A new species, *Pseudocercospora meliosmicola*, and three new records, *P. deglupta*, *P. eucalyptigena*, and *P. infuscans*, are reported from China. Descriptions, illustrations, and discussions of the species concerned are provided. The examined specimens are deposited in HMAS.

Key words—biodiversity, cercosporoid fungi, *Meliosma parviflora*, *Mycosphaerellaceae*, taxonomic novelty

Introduction

Pseudocercospora Speg. (Spegazzini 1910), with more than 1600 names recorded, represents the largest genus of cercosporoid hyphomycetes. The genus comprises plant pathogens either causing distinct necrotic spots or forming effuse fungal colonies without any definite spots, on leaves, stems, flowers, and fruits. Some species are known to cause severe diseases on important crops, which is also reflected in plant quarantine regulations. On the other hand, some have been used as biological control agents of weeds (Den Breeÿen & al. 2006). More than 400 *Pseudocercospora* species have been reported from China (Liu & Guo 1998). Here we propose *Pseudocercospora meliosmicola* on *Meliosma parviflora* as a new species, and report *P. deglupta*, *P. eucalyptigena*, and *P. infuscans* as new records for China.

Taxonomy

Pseudocercospora deglupta Crous, Mycol. Mem. 21: 127, 1998. Fig. 1

Leaf spots amphigenous, subcircular to angular, without definite margin, 1–5 mm wide, confluent, pale gray to gray to brown, with a pale gray to pale olivaceous brown halo on the upper surface, pale grayish brown to pale brown on the lower surface. Fruiting hypogenous. Mycelium internal. Stromata absent or well-developed, substomatal, subglobose, dark brown, 20–40 µm diam. Conidiophores few, emerging through stomata, or in dense fasciculate, olivaceous brown to dark olivaceous brown, paler towards the apex, regular in width, cylindrical, unbranched or branched, smooth

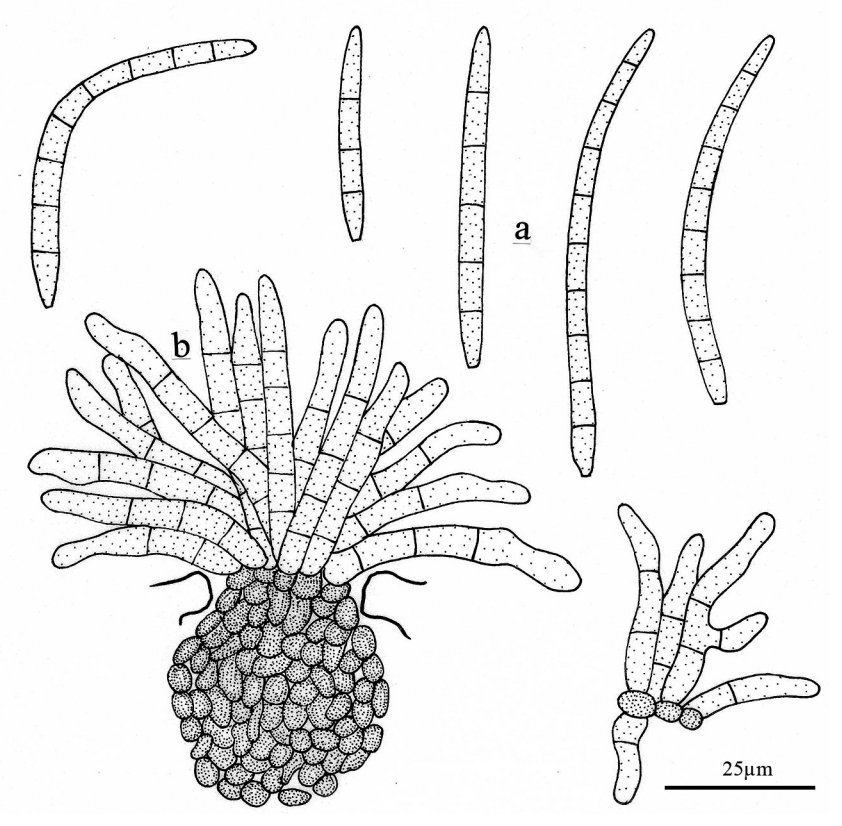

Fig. 1 *Pseudocercospora deglupta* (HMAS 247119).
a. Conidia; b. Conidiophores. Scale bar = 25 µm.

to finely verruculose, straight to curved, obtuse to conical at the apex, 1–7-septate, 20–60(–80) × 3.2–5.4 μm. Conidiogenous loci inconspicuous, unthickened and not darkened. Conidia solitary, obclavate-cylindrical to cylindrical, olivaceous to moderately olivaceous brown, straight to cured, finely verruculose, obtuse at the apex, obconically truncate at the base, hila neither thickened not darkened, 3–10-septate, 32–90 × 3–4.5 μm.

Specimen examined: On living leaves of *Eucalyptus globulus* Labill. (*Myrtaceae*): **China**, **Yunnan Province**, Fenglu, 27.IX.1987, coll. Guo Y.L. no. 1141 (HMAS 247119).

Notes: *Pseudocercospora basitruncata* Crous on *Eucalyptus* sp. is similar to *P. deglupta*, but differs in having amphigenous fruiting, sympodially or percurrently proliferating conidiogenous cells, and paler (hyaline to olivaceous) and narrower conidia (25–70(–90) × 2.5–3(–3.5) μm; Crous 1998).

Pseudocercospora eucalyptigena U. Braun, Fungal Diversity 8: 42, 2001. Fig. 2

Leaf spots amphigenous, irregularly angular, without definite margin, 1–4.5 mm wide, vein-limited, often confluent, yellowish brown to brown on the upper surface, pale brown to graying brown on the lower surface. Fruiting hypogenous. Mycelium internal and external; hyphae pale olivaceous to olivaceous, branched, smooth, septate, 2–3 μm wide. Stromata absent or small, substomatal, subglobose, olivaceous brown, 10–30 μm diam. Conidiophores few, emerging through stomatal, loose fasciculate or arising singly as lateral branches from external mycelial hyphae, pale olivaceous to pale olivaceous brown, paler towards the apex, irregular in width, not branched, straight to curved, 0–1-geniculate, denticulate, obtuse to conical at the apex, 0–1(–2)-septate, primary conidiophores 8–35 × 2.5–3.5 μm, secondary conidiophores (arising from superficial hyphae) 5–25 × 2.5–3.5 μm. Conidiogenous loci inconspicuous, unthickened and not darkened. Conidia solitary, cylindrical to cylindrical-obclavate, pale olivaceous, straight to strongly curved, acute to obtuse at the apex, subtruncate to obconically truncate at the base, hila neither thickened nor darkened, indistinctly 3–12-septate, 35–80(–100) × 2–3 μm.

Specimen examined: On living leaves of *Eucalyptus* sp. (*Myrtaceae*): **China**, **Taiwan**, Taibei, 20.VII.1926, coll. Sawada K., no. 9196 (HMAS 05196).

Notes: *Pseudocercospora cubae* Crous, *P. deglupta* Crous, and *P. denticulata* Crous on *Eucalyptus* sp. all differ from *P. eucalypticola* in having finely verruculose conidiophores and conidia. Additionally, *P. cubae* differs in having

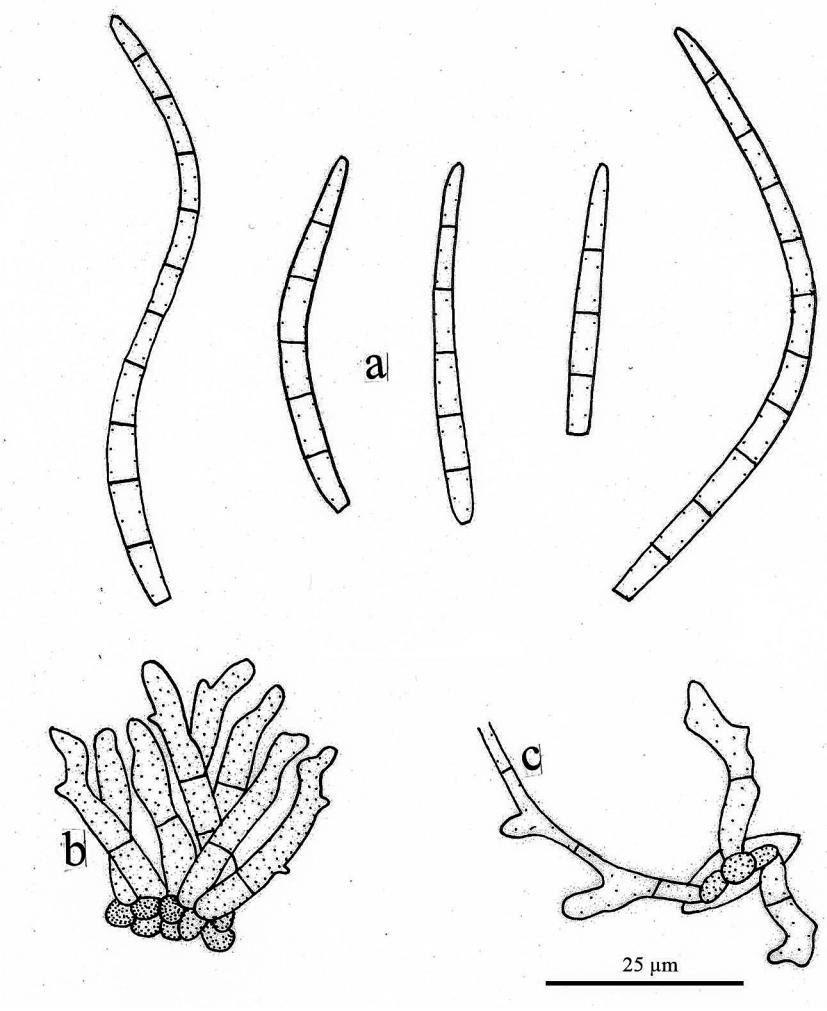

Fig. 2 *Pseudocercospora eucalyptigena* (HMAS 05196).
a. Conidia; b. Conidiophores; c. Stroma. Scale bar = 25 μm.

sympodially or percurrently proliferating conidiogenous cells (Crous 1998); *P. deglupta* possesses longer and wider conidiophores (60–120 × 4–6 μm) and wider conidia (3.0–4.0(–4.5 μm); Crous 1998); and *P. denticulata* has amphigenous fruiting, larger stromata (60 μm wide, 30 μm high), and darker (moderately brown), wider conidiophores (3–5 μm; Crous 1998).

Pseudocercospora infuscans (Ellis & Everh.) U. Braun,
Monogr. Cercosp. Ramul. Allied Gen. 2: 402, 1998. Fig. 3

Misapplied: *Pseudocercospora toxicodendri* sensu Liu & Guo (1989)

Leaf spots amphigenous, subcircular to angular, 1–4 mm wide, grayish white to red-brown on the upper surface, yellowish brown to pale red-brown on the lower surface. Fruiting hypogenous. Mycelium internal and

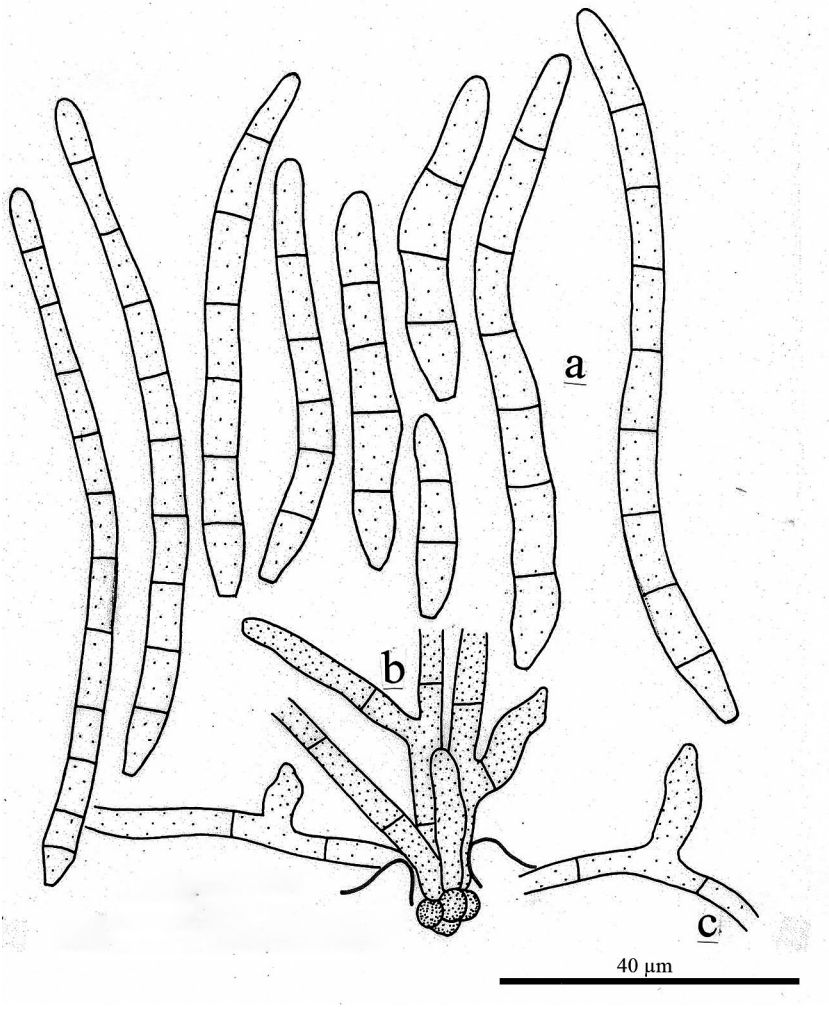

Fig. 3 *Pseudocercospora infuscans* (HMAS 60028).
a. Conidia; b. Conidiophores; c. Stroma. Scale bar = 40 μm.

external, subhyaline, branched, smooth, septate, 2–3 µm diam. Stromata absent. Conidiophores 2–5, emerging through stomata or arising singly as lateral branches from external mycelial hyphae, olivaceous to pale olivaceous brown, uniform in color, irregular in width, branched, geniculate, denticulate, straight to curved, rounded to conical at the apex, 1–7-septate, sometimes constricted, 6.5–125 × 3–5.5 µm. Conidiogenous loci inconspicuous, unthickened and not darkened. Conidia solitary, cylindrical to cylindrical-obclavate, pale olivaceous, straight to curved, obtuse at the apex, obconically truncate at the base, hila neither thickened not darkened, 2–11-septate, 30–120 × 3–6.5 µm.

Specimens examined: On living leaves of *Rhus chinensis* Mill. (*Anacardiaceae*): **China**, **Hunan Province**, Longshan, 28.VIII.1958, coll. Chen Q.T., Liang L.S. no. 135 (HMAS 55957); no. 143 (HMAS 55958). **Sichuan Province**, Emeishan, 17.X.1958, coll. Song M.H. no. 235 (HMAS 60028).

Notes: Guo & Liu (1989) introduced the combination *Pseudocercospora toxicodendri* (Ellis) X.J. Liu & Y.L. Guo (≡ *Cercospora toxicodendri* Ellis) and erroneously applied this name to *Pseudocercospora* collections on *Rhus chinensis* Mill. in China. Based on examination of the type material, Braun (1998) revealed that *C. toxicodendri* represents a species of *Cercosporella*, reallocated *Cercospora infuscans* to *Pseudocercospora,* and emphasized that the Chinese collections, erroneously assigned to *P. toxicodendri*, agree with *P. infuscans*, although the conidia are somewhat narrower (3–5.5 µm), and the conidia longer (to 120 µm) compared to North American samples, which are characterized by broader (3–8 µm) conidiophores and shorter (30–70) conidia (Braun 1998). The re-examination of the Chinese collections on *R. chinensis* cited under "specimens examined" showed that they should be properly referred to as *Pseudocercospora infuscans* as emphasized by Braun (1998) and Braun & al. (2016).

Pseudocercospora meliosmicola Y.L. Guo, Qian Zhao & Y.X. Shi, **sp. nov.** Fig. 4

MB 823728

Differs from *Pseudocercospora sabiae* by its longer, denticulate conidiophores and its paler, longer conidia.

Type: China, Zhejiang Province, Hangzhou, on living leaves of *Meliosma parviflora* Lecomte (*Sabiaceae*), 27.IX.1961, coll. Ma Qi-ming, Liu Xi-jin 581 (**Holotype**, HMAS 168350).

Etymology: Derived from the host genus *Meliosma*.

Leaf spots amphigenous, circular to angular, 1–6 mm wide, often confluent, red-brown, dark brown to almost black, with a pale olivaceous brown halo

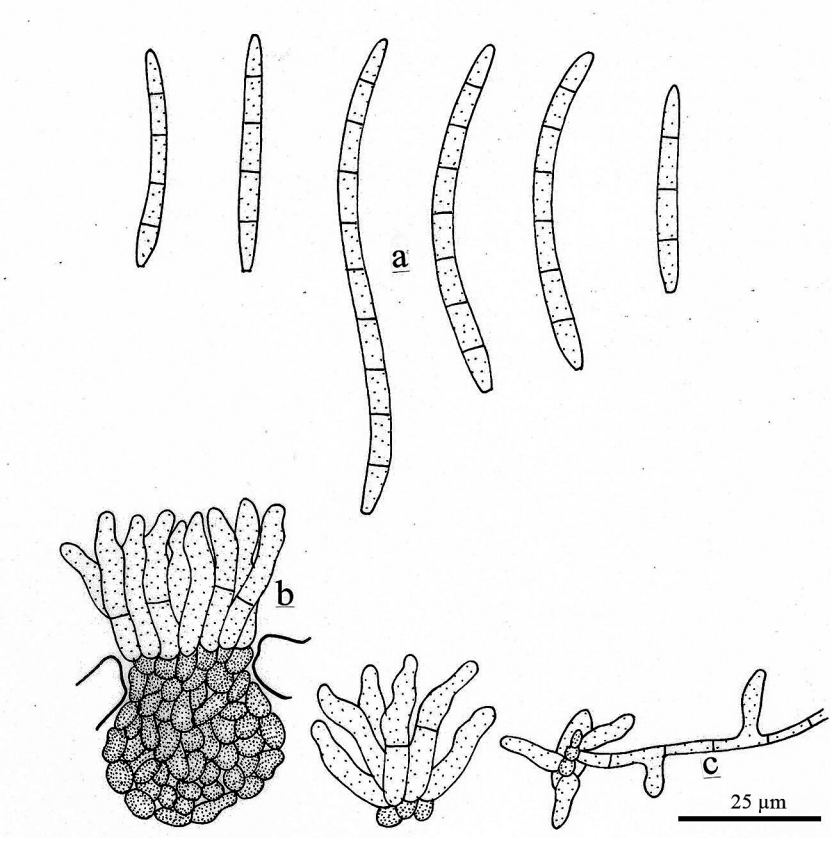

Fig. 4 *Pseudocercospora meliosmicola* (holotype, HMAS 168350).
a. Conidia; b. Conidiophores; c. Stroma. Scale bar = 25 μm.

on the upper surface, olivaceous brown to pale brown, with an olivaceous brown halo on the lower surface. Fruiting amphigenous. Mycelium internal and external; hyphae olivaceous, branched, smooth, septate, 2–2.5 μm wide. Stromata substomatal, only a few brown globose cells to well-developed, subglobose, dark brown, 20–40 μm diam. Conidiophores few, emerging through stomata, loose to dense fasciculate or arising singly as lateral branches from external mycelial hyphae, olivaceous to pale olivaceous brown, uniform in color, irregular in width, straight to geniculate-curved, branched, smooth, rounded to conical at the apex, 0–1-septate, 8–35 × 3–3.5(–4) μm. Conidiogenous cells cylindrical, 8–24

μm long, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, cylindrical to narrowly obclavate-cylindrical, olivaceous to very pale olivaceous brown, smooth, straight to curved, obtuse at the apex, obconically truncate at the base, hila neither thickened nor darkened, indistinctly 3–7(–10)-septate, 25–70(–85) × 2.5–3.5 μm.

Notes: Cercosporoid fungi previously reported on hosts in *Sabiaceae* include *Pseudocercospora sabiae* Y.L. Guo & W.X. Zhao on *Sabia* sp. (Guo & Zhao 1989) and *Cercospora meliosmae* Y.L. Guo & Li Xu on *Meliosma* sp. (Guo & Xu 2004). *Pseudocercospora sabiae* is distinguished from *P. meliosmicola* by its epigenous fruiting habit; conidiophores that are darker (olivaceous to pale brown), denticulate, and longer (15–162 μm); and conidia that are obclavate to cylindrical, paler (pale olivaceous), and longer and slightly wider (40–112.5 × 3–4.3 μm; Guo & Zhao 1989). Its placement in another genus clearly separates *Cercospora meliosmae* from *Pseudocercospora meliosmicola*.

Acknowledgments

This work was supported by the Project for Fundamental Research on Science and Technology, Ministry of Science and Technology of China (No. 2013FY110400); Science and Technology Innovation Program, Chinese Academy of Agricultural Sciences (CAAS-ASTIP-IVFCAAS); Key Laboratory of Horticultural Crops Genetic Improvement, Ministry of Agriculture in China (IVF2017ZF01). We express our deep appreciation to Dr. U. Braun (Martin Luther Universität, Halle, Germany) and Prof. S.Y. Guo (Institute of Microbiology, Chinese Academy of Sciences, Beijing) for their valuable suggestions, kind help, and assistance in the course of submission of this manuscript. We are grateful to Ms. X.F. Zhu for inking line drawing.

Literature cited

Braun U. 1998. A monograph of *Cercosporella*, *Ramularia* and allied genera (phytopathogenic hyphomycetes). Eching: Ihw-Verlag 2: 402 p.

Braun U, Crous PW, Nakashima C. 2016. Cercosporoid fungi (*Mycosphaerellaceae*) 5. Species on dicots (*Anacardiaceae* to *Annonaceae*). IMA Fungus 7(1): 161–216. https://doi.org/10.5598/imafungus.2016.07.01.10

Crous PW. 1998. *Mycosphaerella* spp. and their anamorphs associated with leaf spot diseases of *Eucalyptus*. Mycologia Memoirs 21: 170 p.

Den Breeÿen A, Groenewald JZ, Verkley GJM, Crous PW. 2006. Morphological and molecular characterisation of *Mycosphaerellaceae* associated with the invasive weed, *Chromolaena odorata*. Fungal Diversity 23: 89–110.

Guo YL, Liu XJ. 1989. Studies on the genus *Pseudocercospora* in China I. Mycosystema 2: 225–240.

Guo YL, Xu L. 2004. A new species of *Cercospora* causing leaf spot of *Meliosma* sp. Mycosystema 23: 18–19.

Guo YL, Zhao WX. 1989. Studies on hyphomycetes of Zhangjiajie in Hunan I. *Pseudocercospora*. Acta Mycologica Sinica 8: 118–122.

Liu XJ, Guo YL. 1998. Flora fungorum sinicorum vol. 9: *Pseudocercospora*. Beijing: Science Press.

Spegazzini CL. 1910. Mycetes argentinenses (Series V). Anales del Museo Nacional de Historia Natural de Buenos Aires 20: 329–467.